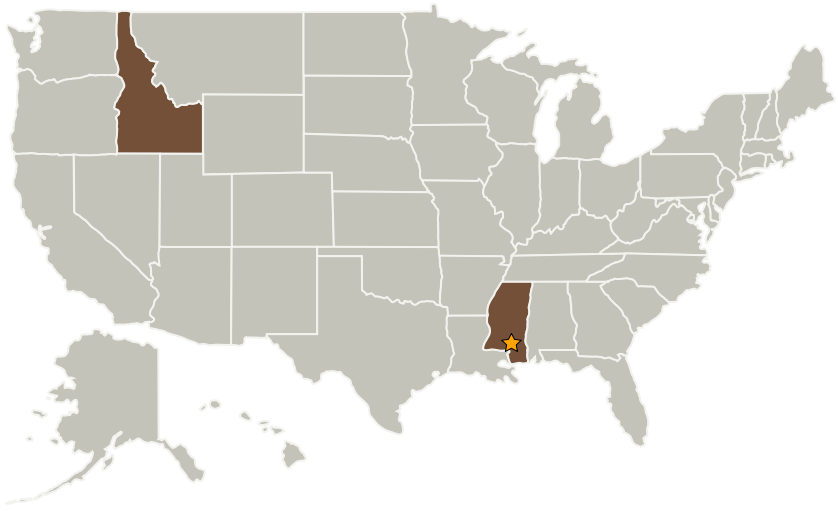
Automated Computational Fluid Dynamics Design With Shape Optimization, Phase I

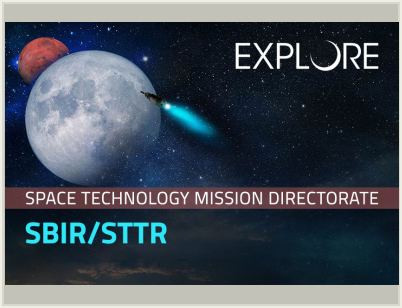
Completed Technology Project (2004 - 2004)

Project Introduction

Computational fluid dynamics (CFD) is used as an analysis tool to help the designer gain greater understanding of the fluid flow phenomena involved in the components being designed. The next step in the design process is to modify the design to improve the componentys performance, typically performed manually by the designer in a trial and error fashion. The innovations proposed herein will provide important advances in the state-of-the-art of automatic CFD shape deformation and optimization software. Optimal Solutions Software (OSS) has been developing a software program called Sculptor, which provides capabilities to perform shape deformation and optimization in CFD design. When the innovations proposed herein are included in Sculptor, and coupled with NASA's Stennis Space Center's (SSC) CFD code, a truly innovative and significant design tool will be available to perform automatic shape optimization. Sculptor can find new geometric shapes, in a timely manner that likely would not have been discovered without its use. Therefore Sculptor is an innovator in and of itself, when used by knowledgeable engineers.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Stennis Space Center (SSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi
Optimal Solutions Software, LLC	Supporting Organization	Industry	Idaho Falls, Idaho

Primary U.S. Work Locations	
Idaho	Mississippi

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Ernest L Perry

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.7 Computational Fluid Dynamics (CFD) Technologies